

# Calc Review Sheet Q2 T1

- ① a)  $s(3) = 21$   
 b)  $v(t) = 3t^2 - 18t + 24$   
 $v(3) = -3$   
 c)  $a(t) = 6t - 18$   
 $a(3) = 0$   
 d) object is neither b/c  $\text{accel} = 0$ .

e)  $v(t) = 0$   
 $3(t^2 - 6t + 8) = 0$  at rest when  
 $3(t-4)(t-2) = 0$   $t=2$  and  $t=4$ .

f)  $v(t)$   $\begin{array}{c} + \quad - \quad + \\ | \quad | \\ 2 \quad 4 \end{array}$  moving right for  
 $t \in [0, 2) \cup (4, \infty)$

g)  $|s(2) - s(0)| + |s(4) - s(2)|$   
 $|23 - 3| + |19 - 23|$   
 $20 + 4 = 24$

② a)  $s(3) = 6$  b)  $v(t) = 3t^2 - 8t + 4$  c)  $a(t) = 6t - 8$   
 $v(3) = 7$   $a(3) = 10$

d) speeding up b/c  $\text{vel.} + \text{accel} > 0$ .

e)  $v(t) = 0$   
 $3t^2 - 8t + 4 = 0$   
 $(3t-2)(t-2) = 0$   
 $t = \frac{2}{3}$   $t = 2$

f)  $v$   $\begin{array}{c} + \quad - \quad + \\ | \quad | \\ \frac{2}{3} \quad 2 \end{array}$  moving left for  $t \in (\frac{2}{3}, 2)$ .

g)  $|s(\frac{2}{3}) - s(0)| + |s(2) - s(\frac{2}{3})| + |s(4) - s(2)|$   
 $|\frac{113}{27} - 3| + |3 - \frac{113}{27}| + |19 - 3| = \frac{496}{27}$   
 $\approx 18.370$

$$\textcircled{3} \text{ a) } (\ln x^5)' = \frac{1}{x^5} \cdot 5x^4 = \frac{5x^4}{x^5} = \frac{5}{x}$$

$$\text{b) } (\ln(3x^2+2x))' = \frac{1}{3x^2+2x} \cdot 6x+2 = \frac{6x+2}{3x^2+2x}$$

$$\text{c) } (e^{4x^3+2})' = e^{4x^3+2} \cdot 12x^2 = 12x^2 e^{4x^3+2}$$

$$\text{d) } \left( \ln \left( -\frac{2x^4}{x^2} \right) \right)' = \left( \ln(-2x^2) \right)' = \frac{1}{-2x^2} \cdot \frac{-4x}{1} = \frac{2}{x}$$

$$\text{e) } (e^{4x^2})' = e^{4x^2} \cdot 8x = 8xe^{4x^2}$$

$$\text{f) } \left( \frac{1-e^{3x}}{2+e^x} \right)' = \frac{(2+e^x)(-3e^{3x}) - (1-e^{3x})(e^x)}{(2+e^x)^2}$$

$$= \frac{-6e^{3x} - 3e^{4x} - e^x + e^{4x}}{(2+e^x)^2} = -\frac{6e^{3x} + 2e^{4x} + e^x}{(2+e^x)^2}$$

$$\text{g) } ((e^x - x)^2)' = 2(e^x - x) \cdot (e^x - 1) = 2e^{2x} - 2e^x - 2xe^x + x$$

$$\text{h) } (x^5 - \ln x + 5e^2)' = 5x^4 - \frac{1}{x} + 0$$

$$\textcircled{4} \text{ Using g.c. } (1, 4) \quad y - 4 = -4(x - 1) \\ f'(1) = -4$$

$$\textcircled{5} (2, -257.482) \quad f'(2) \approx -1088.106$$

$$y + 257.482 = -1088.106(x - 2)$$